

# Use of SpO<sub>2</sub> in Clinical Decision Making: It's Not What They Say

Alan H. Morris, M.D., Thomas D. East, Ph.D., C Jane Wallace, BSN, Meg Franklin, BSN, Laura Heerman, BSN, Tupper Kinder, BS, Matt Sailor, M.S., Debra Carlson, B.S., Richard Bradshaw, and Reed M. Gardner, Ph.D.

Pulmonary Division, LDS Hospital, 8th Avenue and C Street, Salt Lake City, Utah 84143

## ABSTRACT

Computerized protocols that standardize clinical decision making for mechanical ventilation of ICU patients provided the tools for evaluation of the usefulness of SpO<sub>2</sub> in clinical decision making. Systematic examination of the variability between clinical decision makers and of the variability of the link between SpO<sub>2</sub> and PaO<sub>2</sub>, make it unlikely that SpO<sub>2</sub> is actually used in a systematic or rigorous manner in clinical decision making.

## INTRODUCTION

Bedside, non-invasive pulse oximetry, SpO<sub>2</sub>, is commonly cited as an important forcing function for clinical decision making regarding arterial oxygenation in mechanically ventilated patients. A randomized clinical trial of computerized protocols that standardize clinical decisions for mechanical ventilation of lung failure patients (AHCPR: HS06594, T. D. East, Ph.D., Principal Investigator) provided a means of examining the reliability of SpO<sub>2</sub> and its use in clinical decision making [1, 2].

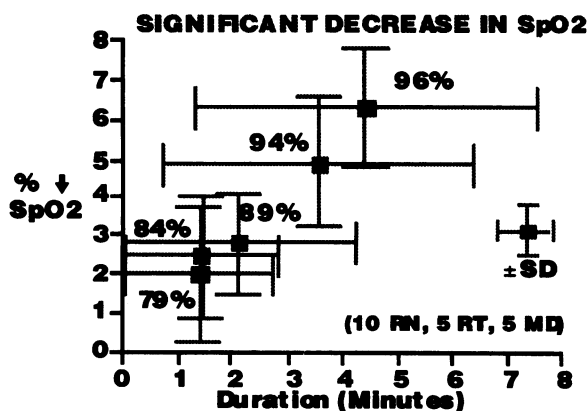
## METHODS

1) Twenty clinicians were surveyed and indicated the decrease and duration in SpO<sub>2</sub> required for a change in therapy.

2) Fifteen thousand pairs of bedside SpO<sub>2</sub> and laboratory PaO<sub>2</sub> (arterial O<sub>2</sub> pressure) from ARDS patients were analyzed.

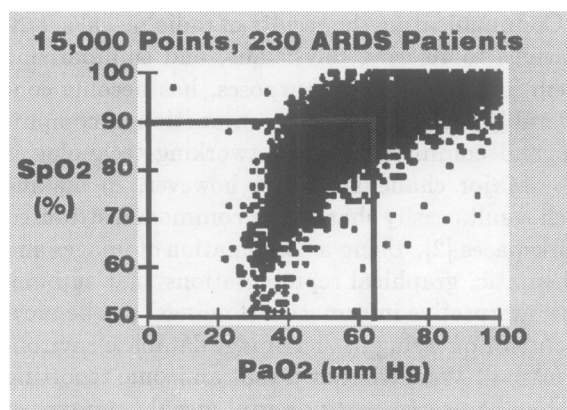
## RESULTS

The magnitude of the average decrease (%↓) in SpO<sub>2</sub> required for a clinical response was linked to the patient's level of SpO<sub>2</sub> (96% to 79%), as was the average duration of the decrease (Figure 1):



While the average PaO<sub>2</sub> of 63 is appropriate for

the clinical break point of 90% for SpO<sub>2</sub> (Figure 2), the distribution of PaO<sub>2</sub> for an SpO<sub>2</sub> of 90% is large (Figure 2):



## DISCUSSION

Clinicians vary regarding the magnitude and the duration of SpO<sub>2</sub> decreases necessary for instituting a change in therapy (Figure 1). The predictability of PaO<sub>2</sub> from SpO<sub>2</sub> is poor (Figure 2).

## SUMMARY

The quality of decisions made from bedside SpO<sub>2</sub> seems quite variable. The likelihood that bedside non-invasive SpO<sub>2</sub> produces consistent and high-quality clinical decisions, as perceived by many clinicians seems low. This is compatible with the well know human tendency to perceive human performance in terms incompatible with objective observation.

## REFERENCE

1. East T. Role of the computer in the delivery of mechanical ventilation. In: Tobin M, ed. Principles and practice of mechanical ventilation. New York, NY: McGraw-Hill, Inc., 1994: 1005-1038.
2. East T, Morris A, Gardner R. Computerized management of mechanical ventilation. In: Grenvik A, Ayres S, ed. Textbook of critical care. 3 ed. Philadelphia, PA: W. B. Saunders Company, 1995: 895-911.

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